

32. (New) A polypropylene film as claimed in claim 29, wherein said wax is a microcrystalline paraffin having a melting point of from 60°C to 100 °C.

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**REMARKS**

Favorable reconsideration and allowance of the present application are respectfully requested in view of the foregoing amendments and the following remarks.

Claims 1 – 17 and 20 - 32 are presently pending in the application.

Claims 1 – 17 have been amended to clearly point out the subject matter which applicants regard as the invention. In detail, claim 1 has been amended to state that the base layer comprises a propylene polymer and a combination of a hydrocarbon resin and a wax. Claim 2 has been amended to change the antecedent-lacking term “the” before “n-heptane” in line 1 to “a.” Claims 11 and 12 have been changed from being dependent from claim 1 to being dependent from claim 10 to provide a proper antecedent basis. Claim 5 has been amended to have a more typical Markush claim language. Claims 11 and 13 – 15 have been amended to delete the word “preferably” or the narrower range, and the narrower ranges have been claimed in newly added claims 22 – 23 and 26. Claim 17 has been amended to be in a more proper process claim format by stating a step of performing an orientation.

Claims 18 and 19 have been canceled and the contents of these claims are claimed in newly added claims 24 and 25, respectively. Claim 24 is directed to a process for the production of oriented polypropylene films and claim 25 is related to a packaging film produced by the process of claim 24.

To provide a proper antecedent basis for claims 14 and 15, claims 20 and 21 have been newly added to claim that the film may have additives, support for which can be found at page 8, lines 9-11 and page 10, lines 32-36 of the application as originally filed, respectively, and claims 14 and 15 have been amended to be dependent from claim 20 and 21, respectively.

Claims 27 to 32 are directed to preferred embodiments of the invention, and support can be found at page 5, line 15 through page 7, line 30.

It is submitted that the claims do not extend beyond the disclosure of the application as originally filed and thus do not introduce new matter.

***Rejection under 35 U.S.C. §112***

**Rejection Based on the Terms “Wax” and “Resin”**

Claims 1 - 17 stand rejected under 35 U.S.C. §112, second paragraph. In particular, the Examiner alleged that the term “a combination of resin and wax” renders the claim indefinite because the specification does not provide differentiating definitions of these terms and that a wax is a resin. The Examiner does not provide any sound ground why he believes wax is a resin.

Applicants respectfully traverse this rejection.

As can be seen in a dictionary (Concise Encyclopaedia Chemistry: Walter de Gruyter & Co. pages 944 and 1172 (1994): Exhibit A), waxes and resins are different from each other. A copy of the relevant pages of the dictionary is submitted in the form of IDS. According to the definitions in the dictionary, waxes have certain technological properties such as being malleable to solid at 20°C with large to small crystals. Also, they are explicitly defined as being not glassy. In contrast, resins are amorphous substances, and are supercooled melts, like glasses. Therefore, resins are brittle at room temperature. Consequently, there is a clear difference between resins and waxes in that waxes are crystalline to semi-crystalline whereas resins are amorphous, which is a non-crystalline structure. Furthermore, resins and waxes have been known per se in the field of films and used to refer to distinct classes of substances. Waxes have been described as lubricant additives for films while hydrocarbon resins have been described as barrier improving components in films. Obviously the dictionary also defines these two categories of substances as different classes. Nowhere is it mentioned that hydrocarbon resins are sometimes called waxes or that these terms are used for the same class of substances.

Furthermore, the specification as originally filed contains the description of the kind and production of hydrocarbon resins at page 5, line 15 through page 6, line 29. It also contains the description of the kind and production of waxes at page 6, line 31 through page 7, line 30.

Accordingly, it is believed that the rejection of claims 1 –17 on the basis that the terms “wax” and “resin” render the claims indefinite cannot withstand close analysis and, thus, it is respectfully requested that the rejection be reconsidered and withdrawn.

**Rejection Based on the Lack of Antecedent Basis**

Claims 2, 4, 6, 11, 12 and 15 stand rejected because they contain limitations lacking sufficient antecedent basis. Claim 1, as amended, states that a base layer comprises a propylene

polymer and a combination of a hydrocarbon wax and a resin, providing a proper antecedent basis to the terms “propylene polymer” and “hydrocarbon” in claims 4 and 6. Claim 2 also has been amended to replace the antecedent-lacking term “the n-heptane-insoluble content” with “a n-heptane-insoluble content.” Claims 11 and 12, as amended, are dependent from claim 10, which provides a sufficient antecedent basis to claims 11 and 12. Also, claim 15 has been amended to be dependent from claim 21, which recites additives for the base layer, including an antistatic.

Accordingly, the rejection based on the antecedent-lacking expression is now moot and it is respectfully requested that this rejection be reconsidered and withdrawn.

Rejection Based on Improper Alternative Expressions

Claim 5 stands rejected because it contains an improper alternative expression or has an improper Markush claim format. Claim 5, as amended, has a proper Markush claim language, i.e., “selected from the group consisting of an unhydrogenated styrene polymer,..... and mixtures thereof.”

Accordingly, this rejection is now moot and it is respectfully requested that this rejection be reconsidered and withdrawn.

Rejection Based on the Use of Broader/Narrower Ranges and “Preferably”

Claims 11 and 13 stand rejected because they recite a broad range and a narrower range in a single claim. Claims 11 and 13 have been amended to delete the narrower range recitations, and claims 22-23 and 26 have been newly added to claim the narrower range.

Claims 14-15 and 18 stand also rejected because they contain the indefinite term “preferably.” Claim 14 and 15 have been amended to delete the term “preferably” and to be dependent from claim 10 and 21, which have been newly added, respectively. Further, claim 18 has been deleted.

Therefore, the rejection is now moot and it is respectfully requested that this rejection be reconsidered and withdrawn.

Rejection Based on the Use of “The Use of...”

Claims 18 and 19 stand rejected because they recite “the use of a propylene film” and “the use of a mixture,” respectively. These claims have been canceled and new claims 24 and 25, directed to a production process and a product produced by the process, respectively, have been added.

Accordingly, the rejection is now moot and it is respectfully requested that the rejection be reconsidered and withdrawn.

***Rejection under 35 U.S.C. §101***

Claims 18 and 19 also stand rejected Under 35 U.S.C. § 101 because they are not in a proper process claim form. As discussed above, these claims have been canceled and new claims 24 and 25 have been added. Claim 24 is directed to a production process which comprises compressing a polymer or a polymer mixture, while claim 25 is related to a packaging film produced by the process.

Accordingly, it is believed that in view of these claim amendments the rejection of these claims is now moot.

***Rejection under 35 U.S.C. §102(a)***

Claims 1-2, 4-7, 10-11 and 13-19 stand rejected as being anticipated by Murschall et al. (U.S. Patent No. 5,246,769: “Murschall”). Applicants respectfully traverse this rejection on the following grounds.

As the court states, a claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference (*Verdegaal Bros. V. Union Oil Co. of Claifornia*, 814 F.2d 628, 2 USPQ2d 1051, 1053 (Red. Cir. 1997). Also, the identical invention must be shown in as complete detail as is contained in the claim. (*Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPA2d 1913, 1920 (Fed. Cir. 1989).

Murschall teaches a biaxially oriented polyolefin packaging film having a base layer, which may contain appropriate additives including antistatic agents, antiblocking agents, lubricants such as waxes, neutralizer, stabilizer and/or low-molecular weight resins. Murschall discloses generally that waxes can be added as lubricants into a polypropylene base layer, without any indication with respect to the molecular weight of the wax. Since waxes can have a

very broad range of molecular weight, the mere general disclosure of waxes does not anticipate the specific election of waxes having of Mn between 200 and 700 as stated in claim 1 of the present application. Indeed, the Examiner acknowledges in his Office Action that Murschall does not specifically limit the hydrocarbon resin, lubricant, or wax to those having a molecular weight as instantly claimed. (at paragraph 12, lines 3 – 4 of February 23, 2002 Office Action).

Thus, Murschall fails to teach or suggest each and every element recited in the claims. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. §102(a) be reconsidered and withdrawn.

***Rejection under 35 U.S.C. §102(e)***

Claims 1-7 and 10-19 stand rejected as being anticipated by Peiffer et al. (U.S. Patent No. 6,068,936: “Peiffer”) Applicants respectfully traverse this rejection.

Like Murschall, Peiffer mentions that a lubricant such as a wax may be added into a base layer composed of polyolefin and cyclo-olefin copolymer (COC) (at column 9, lines 26-32 of Peiffer). There is no teaching or suggestion as to the molecular weight of the wax that can be used for polypropylene film production. As discussed above, since waxes can have a very broad range of molecular weight, the mere general disclosure of waxes does not anticipate the specific election of waxes having of Mn between 200 and 700 as stated in claim 1 of the present application. Indeed, the Examiner acknowledges in his Office Action that Peiffer does not specifically teach a wax having a molecular weight as instantly claimed. (at paragraph 13, lines 3 – 5 of February 23, 2002 Office Action)

The Examiner alleges that cyclo-olefin polymers are equivalent to waxes without giving any basis for such interpretation in his Office Action (at paragraph 11, lines 4-5 of February 27, 2002 Office Action). Cyclo-olefins are polymers which are different from waxes in various aspects including that they are non-crystalline. Indeed, Peiffer mentions waxes as lubricants independently from COC, indicating that these are different substances.

From the light of foregoing argument, it is believed that the rejection can not be sustained and should be reconsidered withdrawn.

***Rejection under 35 U.S.C. §103(a)***

Claims 1 - 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Murschall in view of Yeh et al (U.S. Patent No. 5,155,160: "Yeh") or over Peiffer in view of Yeh.

Yeh describes films which contain waxes for improvement of barrier properties of the film. Nowhere in the disclosure hydrocarbon resins are mentioned as an additional component in the wax-modified films.

The Examiner alleges that it would have been obvious to one having ordinary skill in the art at the time of the invention to utilize any low-molecular weight resin within the disclosed range taught by Murschall or Peiffer and to further utilize any conventional lubricant or wax, wherein polyethylene wax and paraffin wax are obvious species of wax utilized in the art as evidenced by Yeh et al.

However, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) Also the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

To make the combination of Murschall or Peiffer and Yeh desirable, either or both of references should suggest or imply the desirability of the combination or teach a reasonable expectation of success. Thus, the question is whether one skilled in the art could derive from a combined reading of Murschall or Peiffer and Yeh that adds to a low molecular weight resin to a high barrier film (having already a good barrier due to the incorporated wax) would further reduce the water vapor permeability. This synergic effect of both components can by no means be derived from the prior art. There is no motivation to combine resin and wax for the synergic effect.

Murschall is related to the improvement of optical properties such as transparency and gloss (see column 1, lines 25-27 of Murschall), while Yeh is directed to the improvement of barrier properties of films by adding waxes. As discussed above, the instant invention is distinguished from Murschall. The present invention also is differentiated from Yeh in that a hydrocarbon resin is added in addition to the wax, accomplishing further improvement in the

barrier properties of film which is already considered to be a high barrier film due to the improvements achieved by the wax.

Peiffer teaches that a lubricant such as a wax may be added into a base layer composed of polyolefin and cyclo-olefin copolymer. There is no teaching or suggestion on the specific range of molecular weight of the wax that can be used for polypropylene film production.

Accordingly, one skilled in the art would not be motivated by the teachings of Murschall or Peiffer in combination with the teaching of Yeh to mix waxes and hydrocarbon resins to improve the water barrier property of films.

As can be seen from the specification as originally filed, the instant invention achieves an unexpected synergistic effect. The examples and comparative examples in the specification show a comparison of unmodified polypropylene film, wax-modified polypropylene film, resin-modified polypropylene film and the inventive film. The comparative examples show that wax and hydrocarbon resin have similar or equivalent effect with respect to the water vapor barrier:

Comparative Examples 1 (8% resin) and 7 (10% resin) demonstrate the reduction of the water vapor barrier from 0.27/0.95 with 8% of hard resin to 0.25/0.87 with 10% of hard resin. This means that the addition of a further 2% of hard resin to comparative Example 1 reduces the barrier from 0.27 to 0.2 or 0.95 to 0.82, respectively (difference of 0.02/0.07 units, less than 10% improvement).

When the condition of comparative Example 1 is changed by adding a similar amount of wax, the barrier goes down from 0.27/0.95 to 0.19/0.62 (see Example 3). So this clearly demonstrates a synergistic effect of wax and hydrocarbon resin. The barrier is now reduced by 0.08/0.33 units which corresponds to about 30 and 35% improvement, wherein the percentage is based on the higher value.

	Barrier with 8% resin	Barrier Improvement		Difference In units	Improvement In %
At 38°C, 90% humidity	0.27	0.25	2% more resin	0.02	7
	0.27	0.19	3% wax	0.08	30
At 23°C, 80% humidity	0.95	0.87	2% more resin	0.08	8
	0.95	0.62	3% wax	0.33	35

One skilled in the art could not derive from the cited references that the combination of wax and resin results in a synergistic effect on the water vapor barrier. Although the Examiner alleges that the molecular weight is a result-effective variable, it does not help. The instant invention is not only a selection of critical molecular weight ranges, but is the combination of two critical ranges.

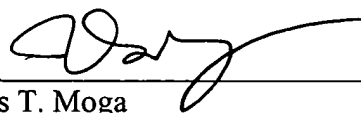
Accordingly, the rejection of claims 1-17 on the ground that one skilled in the art would combine the teachings of Murschal or Peiffer with the teaching of Yeh to make the present invention cannot be sustained, and thus it is respectfully requested that the rejection be reconsidered and withdrawn.

### CONCLUSION

Applicants submit that the present application is now in condition for allowance. Early notice of such action is earnestly solicited and will be greatly appreciated. If any outstanding issues remain, the Examiner is invited to contact the undersigned at the telephone number provided. A marked-up copy of the amended claims is enclosed.

Respectfully submitted,

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By:   
Thomas T. Moga  
Reg. No.: 34,881

POWELL, GOLDSTEIN, FRAZER & MURPHY, LLP  
P.O. Box 97223  
Washington, D.C. 20004  
(202)624-3947

Attachment: Exhibit A





## VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Once amended) A multilayer, biaxially oriented polypropylene film comprising a base layer and at least one heat-sealable top layer, wherein said [which comprises in its] base layer comprises [a] (i) a propylene polymer and (ii) a combination of a hydrocarbon resin and a wax, said [wherein the base layer comprises a] resin having a mean molecular weight  $M_w$  of from 600 to 1500 and said [a] wax having a mean molecular weight  $M_n$  of from 200 to 700.
  
2. (Once amended) A polypropylene film as claimed in claim 1, wherein a [the] n-heptane-insoluble content of the [poly]propylene polymer of the base layer has a chain isotacticity index, measured by means of C-NMR spectroscopy, of at least 95%.
  
3. (Twice amended) A polypropylene film as claimed in claim 1, wherein the propylene polymer has [base layer comprises a polypropylene whose]  $M_w/M_n$  of [is] from 1 to 10.
  
5. (Twice amended) A polypropylene film as claimed in claim 1, wherein said [which comprises as] resin is selected from the group consisting of an unhydrogenated styrene polymer, a methylstyrene-styrene copolymer, a pentadiene copolymer, [or] cyclopentadiene copolymer, an  $\alpha$ -pinene polymer, [or] a  $\beta$ -pinene polymer, a colophony, [or] colophony derivatives, [or] terpene polymers, [and] hydrogenated compounds of terpene polymers, [thereof or] a hydrogenated  $\alpha$ -methylstyrene-vinyltoluene copolymer, [or if desired mixtures thereof] and mixtures thereof.
  
11. (Twice amended) A polypropylene film as claimed in claim 10, wherein the polymer of the top layer[(s)]s has been peroxidically degraded and the degradation factor is in the range from 3 to 15[, preferably from 6 to 10].

12. (Twice amended) A polypropylene film as claimed in claim 10, wherein an interlayer of  $\alpha$ -olefinic polymers has been applied to one or both sides between the base layer and the top layer[(s)]s.

13. (Twice amended) A polypropylene film as claimed in claim 1, wherein the total thickness of the film is from 4 to 60  $\mu\text{m}$  [in particular from 5 to 30  $\mu\text{m}$  and preferably from 6 to 25  $\mu\text{m}$ , where] and the base layer makes up from about 40 to 60% of the total thickness.

14. (Twice amended) A polypropylene film as claimed in claim [1] 20, wherein the base layer comprises [an antistatic, preferably] a tertiary aliphatic amine as an antistatic.

15. (Twice amended) A polypropylene film as claimed in claim 21, wherein the top layer[(s)] comprises [(comprise) a lubricant, preferably] polydimethylsiloxane as a lubricant and [an antiblocking agent] SiO<sub>2</sub> as an antiblocking agent.

16. (Twice amended) A polypropylene film as claimed in claim 1, wherein all layers of the film further comprise neutralizers and stabilizers.

17. (Once amended) A process for the production of a polypropylene film as claimed in claim 1, [wherein the] which comprises performing an orientation in the longitudinal direction [is carried out] with a longitudinal stretching ratio of from 5:1 to 9:1 and in the transverse direction with a transverse stretching ratio of from 5:1 to 10:1.

[18. The use of a polypropylene film as claimed in claim 1 as a packaging film, preferably a cigarette wrapping film.]

[19. The use of a mixture of polypropylene and resin having a mean molecular

weight Mw of from 600 to 1500 and wax having a mean molecular weight Mn of from 200 to 700 in the production of oriented polypropylene films for improving the water vapor barrier action.]

20. (New) The polypropylene film as claimed in claim 1, wherein the base layer further comprises at least one additive selected from the group consisting of neutralizers, stabilizers, antistatics and lubricants.

21. (New) The polypropylene film as claimed in claim 1, wherein the top layer further comprises at least one additive selected from the group consisting of neutralizers, stabilizers, antistatics, lubricants and anti-blocking agents.

22. (New) The polypropylene film as claimed in claim 13, wherein the total thickness of the film is from 5 to 30  $\mu\text{m}$ .

23. (New) The polypropylene film as claimed in claim 13, wherein the total thickness of the film is from 6 to 25  $\mu\text{m}$ .

24. (New) A process for the production of oriented polypropylene films having an improved water vapor barrier action, which comprises compressing a polymer or a polymer mixture, said polymer or polymer mixture containing a resin having a mean molecular weight Mw of from 600 to 1500 and a wax having a mean molecular weight Mn of from 200 to 700.

25. (New) A packaging film produced by the process of claim 24.

26. (New) The polypropylene film as claimed in claim 11, wherein the degradation factor is in the range from 6 to 10.

27. (New) A polypropylene film as claimed in claim 6, wherein the hydrocarbon resin is present in an amount of from 5 to 12% by weight, based on the weight of the base layer.

28. (New) A polypropylene film as claimed in claim 7, wherein the wax is present in an amount of from 1 to 8% by weight, based on the weight of the base layer.

29. A polypropylene film as claimed in claim 7, wherein the wax is present in an amount of from 1 to 6% by weight, based on the weight of the base layer.

30. (New) A multilayer, biaxially oriented polypropylene film comprising a base layer and at least one heat-sealable top layer, wherein said base layer comprises (i) a propylene polymer and (ii) a combination of a resin and a wax,

wherein said resin being a hydrocarbon resin, fully or partially hydrogenated, having a softening point of 80°C or above and having a mean molecular weight Mw of from 600 to 1500; and

said wax being selected from the group consisting of polyethylene waxes, macrocrystalline paraffin waxes, microcrystalline paraffins and mixtures thereof and having a mean molecular weight Mn of from 200 to 700.

31. (New) A polypropylene film as claimed in claim 29, wherein said hydrocarbon resin is selected from the group consisting of petroleum resins, styrene resins, cyclopentadiene resins, terpene resins and mixtures thereof.

32. (New) A polypropylene film as claimed in claim 29, wherein said wax is a microcrystalline paraffin having a melting point of from 60°C to 100 °C.